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ENERGY UPDATE

by DAVID I. VERWAY, *Research Professor, Division of Research, Graduate School of Business Administration, Michigan State University*

According to a recent publication from the Federal Energy Data System, Michigan ranked twenty-first among the states in energy consumption per capita in 1960. Louisiana, Wyoming, and Texas, leaders in petroleum and natural gas production and themselves energy intensive, topped the list. Because Wyoming has few people in relation to its geographic expanse, that state also spends considerably more than the average on transportation. Indiana ranks fourth, no doubt because of several steel furnaces and gasoline refineries in the Gary area.

At the bottom of the list appeared the names of several southern states, poor and with relatively little manufacturing, and some eastern states with good mass transit systems (see Table 1). By 1977, some southern states had moved up in the rankings, most noticeably Mississippi (from last to 31), Georgia (from 48 to 26), and South Carolina (from 44 to 25). These states have broadened their economic bases through industrial recruitment, primarily vintage manufacturers from the North. South Carolina also is a leader in attracting foreign direct investment.

When some states move up, others must move down. Every state bordering the Great Lakes has declined in the rankings, particularly Michigan, which fell to 35 in 1977. Table 2 compares Michigan's retreat in energy consumption with the nation as a whole. During the early 1960s, our energy appetite was growing considerably more rapidly than the rest of the nation's, but the rate has been well below the U.S. average since then.

The turnaround essentially reflects the way in which Michigan benefited from the exceptional national prosperity of the mid-1960s and has performed since then. Almost everywhere in the country, unemployment was declining and automobile purchases increased. Nationally, the level of income received by households rose 26 percent, after adjustment for increased prices, and in Michigan the rate of gain was 31 percent between 1960 and 1965. The number of factory hours worked by Michigan production workers jumped by 22 percent, more than double the national figure of 10 percent. The state's growth rate was unsustainable because of capacity limitations as well as a saturated demand for motor vehicles. Also, the South accelerated its recruitment of industry during the 1960s, at the expense of states which hosted outmoded factories. Between 1965 and 1977, the number of production hours in Michigan factories declined by 5 percent, whereas nationally there was no change.

Economic growth during the early 1960s spurred industrial consumption of coal, natural gas, and electricity in Michigan (see Table 3). In the use of energy for transportation, the state's gain was only slightly above the national figure, suggesting that many vacationing Michiganians bought gasoline out of state. This conclusion is reinforced by the statistics in Table 3, which show that energy consumption for commercial purposes grew by only 17 percent in the Wolverine State, compared with 25 percent in the rest of the country. In other words, the data reflect the fact that gasoline stations and other merchants in this state failed to cash in on the mid-1960s boom because, increasingly, vacationers were drawn to other places.

Coal consumption has declined in Michigan since the mid-1960s, whereas nationally the use of this fuel has grown, albeit slowly in com-

TABLE 1
Ranking of States According to Per Capita Energy Consumption: 1960 and 1977

Rank	State	Energy Consumption per capita[a] 1960	1977	Rank	State	Energy Consumption per capita[a] 1960	1977	Rank	State	Energy Consumption per capita[a] 1960	1977
1.	Louisiana	411	980(2)	18.	Colorado	243	336(27)	35.	Maine	201	311(34)
2.	Wyoming	393	1,204(1)	19.	North Dakota	237	448(13)	36.	Arkansas	200	355(22)
3.	Texas	386	655(5)	20.	Tennessee	236	336(28)	37.	Massachusetts	198	245(45)
4.	Indiana	350	468(11)	21.	Michigan	227	306(35)	38.	Connecticut	196	244(46)
5.	West Virginia	335	668(4)	22.	Iowa	222	345(23)	39.	Missouri	194	322(29)
6.	Montana	326	503(8)	23.	Maryland	221	269(39)	40.	New Hampshire	194	241(47)
7.	Utah	319	364(19)	24.	Oregon	219	313(32)	41.	Rhode Island	194	181(50)
8.	Delaware	309	409(15)	25.	Kentucky	216	404(16)	42.	South Dakota	187	345(23)
9.	Nevada	301	543(6)	26.	Nebraska	216	384(17)	43.	New York	176	235(49)
10.	Ohio	296	376(18)	27.	Minnesota	213	319(30)	44.	South Carolina	175	337(25)
11.	Alaska	290	719(3)	28.	Oklahoma	212	472(10)	45.	North Carolina	166	268(40)
12.	Washington	286	429(14)	29.	Virginia	212	261(42)	46.	Florida	156	254(43)
13.	Pennsylvania	276	362(21)	30.	Wisconsin	211	295(37)	47.	Hawaii	156	254(44)
14.	Alabama	274	476(9)	31.	New Mexico	210	509(7)	48.	Georgia	151	304(36)
15.	Kansas	266	454(12)	32.	Arizona	209	344(25)	49.	Vermont	150	267(41)
16.	Idaho	257	311(33)	33.	New Jersey	208	240(48)	50.	Mississippi	148	317(31)
17.	Illinois	251	362(20)	34.	California	201	269(38)	51.	Dist. of Columbia	132	170(51)
								52.	United States	235	355

SOURCE: Developed from U. S. Department of Energy, Energy Information Administration, *Federal Energy Data System (FEDS) Statistical Summary Update* (Washington, D.C.: U. S. Government Printing Office, 1979), Table 1; Bureau of the Census, *Statistical Abstract of the United States, 1978* (Washington, D.C.: U. S. Government Printing Office, 1978), Table 11, and Bureau of the Census, *Current Population Reports*, Series P-25, No. 799 (Washington, D.C.: U. S. Government Printing Office, 1979), Table 1.
a. Millions of British thermal units of energy consumed per capita within the state. The figures in parentheses are the 1977 rankings. States are arrayed according to 1960 rankings.

parison with petroleum, natural gas, and nuclear energy. Electrical utilities and chemical, paper, and transportation manufacturers were the major coal consumers in this state during the early 1960s and remain so today. However,

TABLE 2
Trend in Per Capita Energy Consumption in Michigan and the United States: 1960–1979

Year	Per capita Michigan	Per capita United States	Michigan as a percentage of United States Per capita	Michigan as a percentage of United States Total[a]
1960	227	235	97	4.2
1961	228	235	97	4.2
1962	244	245	100	4.3
1963	253	252	100	4.2
1964	259	261	99	4.2
1965	272	269	101	4.4
1966	285	282	101	4.4
1967	293	298	98	4.3
1968	303	310	98	4.3
1969	310	325	95	4.2
1970	314	334	94	4.1
1971	312	335	93	4.0
1972	328	351	93	4.1
1973	328	357	92	4.0
1974	310	345	90	3.9
1975	314	335	94	4.1
1976	322	348	93	3.9
1977	306	355	86	3.6
1978[b]	327	360	91	3.8
1979[b]	304	359	85	3.5

SOURCE: Developed from U. S. Department of Energy, Energy Information Administration, *Federal Energy Data System (FEDS) Statistical Summary Update* (Washington, D.C.: U. S. Government Printing Office, 1979), Table 1; and Bureau of Business and Economic Research, Graduate School of Business Administration, Michigan State University, *Michigan Statistical Abstract*, 15th ed., forthcoming (East Lansing: 1980), Table 2.
a. Total energy, not per capita energy consumption.
b. Author's estimates.

Michigan chemical producers used fewer than one million tons of coal in 1976, the most recent figure, compared with 2.7 million tons during 1962.[1] Consumption among paper companies in the state fell from 1.9 million tons to less than 600,000 tons, and among motor vehicle manufacturers from 1.7 million tons to 1.1 million tons. Coal and coke consumption by the state's iron castings and steel industries also decreased, despite increases in production. Coal's decline appears to be the result of several factors: a shift to other fuels, especially nuclear energy, natural gas, and residual fuel oil (and to electric arc furnaces in basic steel and cast iron); conservation; and a changing industrial base, in that order. In 1965, 95 percent of this state's electricity was made from coal, a figure that now stands at about 65 percent. Moreover, we have become a net importer of electricity during periods of peak demand, such as occurred in 1978.

Natural gas has replaced coal as Michigan's most important fuel source (see Table 4). However, we still consume more coal and less natural gas per capita than the rest of the nation. We use appreciably less petroleum, on average, than the nation, primarily because of a heavier reliance on residual fuel oil elsewhere. This fuel is popular in the East, where it has replaced coal as a boiler fuel in order to satisfy air quality standards. We have about the same degree of nuclear dependence as the rest of the nation. Hydroelectric power is a negligible factor in Michigan's total energy picture.

Energy price data are sketchy. Those for the Detroit area indicate that gasoline, fuel oil, and electricity prices are above the average for large U.S. cities, whereas natural gas sells for less. It seems likely that the same is true of the state in comparison with the nation as a whole. Michigan's major advantage in this regard is its supply

TABLE 3
Percentage Change in Energy Consumption in Michigan and the United States, by Fuel Type and Consumer Type: 1960–1965, 1965–1977, and 1960–1977

	Percentage change					
	Michigan			*United States*		
Gross energy consumption	*1960–1965*	*1965–1977*	*1960–1977*	*1960–1965*	*1965–1977*	*1960–1977*
By fuel type						
Gasoline	23	47	80	17	57	84
Residual fuel oil	(29)	166	90	4	95	103
Distillate	(5)	29	22	9	36	48
Diesel	150	158	545	66	164	339
Jet fuel	38	37	89	66	58	162
LPG	31	140	214	26	64	107
Kerosene	45	(77)	(67)	(2)	(35)	(36)
Coal	32	(18)	8	19	20	43
Natural gas	52	34	103	39	38	92
Nuclear	–	5,615	–	–	6,827	–
Hydro	(8)	(52)	(56)	33	14	51
Other	3	47	51	16	46	70
By end use						
Residential	19	5	25	16	23	43
Commercial	17	44	69	25	45	81
Industrial						
Coal	16	(58)	(52)	9	(37)	(32)
Coke	18	(25)	(11)	17	(17)	(3)
Natural gas	66	41	134	37	42	95
Electric	48	73	156	26	75	120
Total	25	(5)	18	19	26	51
Transportation	27	56	97	25	61	102
TOTAL	28	23	57	23	47	81

SOURCE: Developed from U. S. Department of Energy, Energy Information Administration, *Federal Energy Data System (FEDS) Statistical Summary Update* (Washington, D.C.: U.S. Government Printing Office, 1979), Tables 1, 3, 4, 5, and 6.
NOTE: Parentheses indicate decline.

of natural gas. The state's vast depleted oil and gas fields are used to store gas produced in the Gulf Coast area. That gas is delivered during the summer, when demand is low. Production from native wells satisfies about 15 percent of state demand for gas; for petroleum, the figure is about 5 percent. Self-sufficiency in coal is zero, as Michigan's coalfields are not economical at current prices.

THE NEAR FUTURE

Times are bright for the approximately 3,000 people employed in Michigan's oil and gas extraction industries because of rising prices for their products. However, 1980 shapes up less favorably for the more than 65,000 people who deliver gasoline, read meters, stoke boilers, and perform the myriad other tasks entailed in supplying energy. They will be seriously affected by the general economic slump here.

Consumers can expect rising prices for all forms of energy because of OPEC as well as decontrol at the wellhead. Although it might not seem so to the average American, gas and petroleum prices in this country have been depressed by the cheap energy policy of successive Washington administrations. That policy is no longer viable. Most experts are predicting a rapid inflation in energy prices in early 1980. The rate should diminish by late spring, barring further OPEC hikes and a disruption in supply. It is important to bear in mind the virtue of higher prices in encouraging producers to develop coal, oil, and gas supplies; build new refineries and electric generating plants; and find new ways to provide energy. High prices also have discouraged consumption of petroleum goods, thus curtailing our dependence on imported oil, an important political consideration.

LONG-TERM OUTLOOK

By 1985, energy consumption in Michigan will average 354 million BTUs, 8 percent above the recent high level of 327 million BTUs reached in 1978. The national average is expected to be 380 million BTUs per capita, a 6 percent increase over the 1978 figure. Between 1985 and 2000, the Michigan average is forecast to grow by 20 percent (to 421 million BTUs per capita), the national by 17 percent (to 445 million BTUs per capita). These figures were developed more than a year ago by the U. S. Department of Commerce in forecasts for all states.

That report projects a declining consumption of petroleum (32 percent in Michigan and 27 percent nationally) and natural gas (16 percent and 9 percent, respectively). Coal will become more important (consumption increasing by 126 percent in this state and 177 percent in the nation). It is envisaged that coal (.03 percent of the national total) will be mined in the Wolverine State.

A less pessimistic petroleum forecast has been developed by the Michigan Energy Administration on the basis of an exhaustive evaluation of published geological and engineering studies.[2] It projects a "probable" national availability of petroleum equivalent to the amount consumed during 1976. But even this relatively sanguine fore-

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Michigan Economic Indicators

Item	Year previous of latest month	Previous month	Latest month
Manufacturing workers:			
Average weekly hours, Michigan	43.6	41.0	39.2 (Nov.)
Average weekly hours, U.S.	40.9	40.3	40.2 (Nov.)
Average hourly earnings, Michigan ($)	8.52	8.91	8.87 (Nov.)
Average hourly earnings, U.S. ($)	6.38	6.82	6.85 (Nov.)
U.S. motor vehicle production (units)	1,127,609	607,205	733,456 (Jan.)
Michigan electricity usage (mil. kwh.)	6,080	5,823	5,701 (Oct.)
Industrial (mil. kwh.)	2,963	2,695	2,679 (Oct.)
Residential (mil. kwh.)	1,772	1,759	1,652 (Oct.)
Raw steel production:			
Michigan (000 net tons)	926	753	751 (Dec.)
United States (000 net tons)	11,812	9,997	9,996 (Dec.)
Consumer price index (1967 = 100)			
Detroit area	202.2	231.3	233.3 (Dec.)
United States	202.9	227.5	229.9 (Dec.)
U.S. wholesale price index (1967 = 100)	217.5	246.9	249.4 (Dec.)
Michigan farm prices received index (1967 = 100)	214	231	236 (Dec.)

SOURCES: U.S. Bureau of the Census; U.S. Bureau of Labor Statistics; Michigan Crop Reporting Service; Motor Vehicle Manufacturers Association, Inc.; American Iron and Steel Institute; and Edison Electric Institute.

Contracts for Future Building, First 12 Months: 1978 and 1979

(Thousands of dollars)

Area	Nonresidential			Residential			Total[a]		
	1978	1979	Percentage change	1978	1979	Percentage change	1978	1979	Percentage change
Ann Arbor	59,942	75,052	+ 22	90,402	82,717	− 9	150,344	157,769	+ 5
Battle Creek	40,622	21,988	− 46	29,838	37,586	+ 26	70,460	59,574	− 15
Bay City	12,445	10,530	− 15	18,447	14,060	− 24	30,892	24,590	− 20
Detroit	902,153	1,013,597	+ 12	1,132,079	1,095,321	− 3	2,034,232	2,108,918	+ 4
Flint	76,447	82,857	+ 8	104,031	98,385	− 5	180,478	181,242	—
Grand Rapids	173,722	263,125	+ 51	206,104	170,191	− 17	372,826	433,316	+ 14
Jackson	14,138	19,386	+ 37	24,498	35,177	+ 44	38,636	54,563	+ 41
Kalamazoo-Portage	35,058	59,530	+ 70	80,430	70,378	− 12	115,488	129,908	+ 12
Lansing–East Lansing	92,096	98,691	+ 7	121,114	161,029	+ 33	213,210	259,720	+ 22
Muskegon–Norton Shores–Muskegon Heights	23,686	21,411	− 10	38,371	26,255	− 32	62,057	47,666	− 23
Saginaw	68,811	38,873	− 44	49,649	61,674	+ 24	118,460	100,547	− 15
Michigan	1,752,267	1,945,482	+ 11	2,469,130	2,399,418	− 3	4,221,397	4,344,900	+ 3
United States	45,045,834	49,659,492	+ 10	74,949,473	74,685,642	—	119,995,307	124,345,134	+ 4

SOURCE: F. W. Dodge Division of McGraw-Hill Information Systems Company, news releases.

NOTE: Battle Creek includes Barry and Calhoun counties; Detroit includes Lapeer, Livingston, Macomb, Oakland, St. Clair, and Wayne counties; Flint includes Genesee and Shiawassee counties; Grand Rapids includes Kent and Ottawa counties; Kalamazoo-Portage includes Kalamazoo and Van Buren counties; Lansing–East Lansing includes Clinton, Eaton, Ingham, and Ionia counties; and Muskegon–Norton Shores–Muskegon Heights includes Muskegon and Oceana counties.

a. Excludes nonbuilding construction contracts. This category comprises streets and highways, bridges, dams, reservoirs, river and harbor developments, sewerage and water supply systems, missile and space flight facilities, airports, utilities, and communication systems. For Michigan the 1978 and 1979 figures for nonbuilding construction contracts were $1,821,304,000 and $892,825,000 respectively, or a decrease of 51 percent. U. S. figures for nonbuilding construction contracts were $39,934,701,000 and $42,032,763,000 or an increase of 5 percent.

Quarterly Personal Income in Michigan

	Millions of dollars, annual rates, seasonally adjusted							Percentage change 79(2) to 79(3)	
	1978				1979				
	1	2	3	4	1	2	3	Michigan	United States
TOTAL LABOR AND PROPRIETORS INCOME BY PLACE OF WORK									
By type									
Wage and salary disbursements	50,530	51,695	53,035	54,949	56,118	54,885	54,673	− .3	+ 2.1
Other labor income	6,506	6,590	6,786	7,058	7,243	7,050	7,025	− .4	+ 3.8
Proprietors income	3,377	3,488	3,554	3,685	3,634	3,679	3,866	+ 5.1	+ .8
Farm	542	574	556	589	546	573	662	+15.5	− 8.5
Nonfarm	2,835	2,914	2,998	3,096	3,088	3,106	3,204	+ 3.2	+ 3.8
By industry									
Farm	688	722	708	748	713	746	837	+12.2	− 6.2
Nonfarm	59,725	61,052	62,666	64,945	66,281	64,868	64,727	− .2	+ 2.4
Private	51,964	53,059	54,469	56,594	57,850	56,257	55,989	− .5	+ 2.6
Ag. Serv., For., Fish., and other	123	134	137	141	147	155	161	+ 3.9	+ 4.1
Mining	281	314	323	338	337	349	359	+ 2.9	+ 3.1
Construction	2,928	2,951	3,112	3,198	3,203	3,471	3,543	+ 2.1	+ 3.0
Manufacturing	26,414	26,887	27,436	28,912	29,550	27,622	26,541	− 3.9	+ 1.2
Nondurable goods	3,907	3,999	4,056	4,323	4,254	4,182	4,193	+ .3	+ 1.4
Durable goods	22,507	22,888	23,380	24,589	25,296	23,441	22,347	− 4.5	+ 1.1
Transportation and public utilities	3,333	3,426	3,462	3,526	3,585	3,295	3,474	+ 5.4	+ 5.4
Wholesale trade	3,001	3,092	3,207	3,293	3,372	3,429	3,473	+ 1.3	+ 2.7
Retail trade	5,317	5,447	5,570	5,728	5,899	5,994	6,113	+ 2.0	+ 1.4
Finance, insurance, and real estate	2,299	2,342	2,430	2,507	2,542	2,592	2,693	+ 3.9	+ 4.2
Services	8,268	8,468	8,792	8,952	9,214	9,349	9,632	+ 3.0	+ 3.5
Government and government enterprises	7,762	7,993	8,197	8,351	8,432	8,612	8,739	+ 1.5	+ 1.1
Federal, civilian	938	960	986	1,028	1,060	1,070	1,082	+ 1.1	+ 1.2
Federal, military	190	191	195	201	201	199	199	0	+ .3
State and local	6,633	6,841	7,016	7,122	7,171	7,342	7,457	+ 1.6	+ 1.2
DERIVATION OF PERSONAL INCOME BY PLACE OF RESIDENCE									
Total labor and proprietors income by place of work	60,413	61,773	63,374	65,693	66,994	65,614	65,564	− .1	+ 2.2
Less: Personal contributions for social insurance by place of work	2,983	3,006	3,062	3,153	3,424	3,300	3,254	− 1.4	+ 1.7
Net labor and proprietors income by place of work	57,430	58,767	60,312	62,539	63,571	62,314	62,310	0	+ 2.2
Plus: Residence adjustment	342	361	371	381	398	410	421	+ 2.7	+ 3.4
Net labor and proprietors income by place of residence	57,772	59,127	60,683	62,920	63,969	62,723	62,732	0	+ 2.2
Plus: Dividends, interest, and rent	8,312	8,595	8,974	9,321	9,627	9,900	10,137	+ 2.4	+ 2.4
Plus: Transfer payments	8,722	8,895	9,171	9,280	9,522	9,830	10,454	+ 6.3	+ 7.0
State U.I. benefits	543	580	443	365	404	460	434	− 5.7	+ 9.5
Transfers excluding state U.I.	8,180	8,315	8,728	8,916	9,118	9,370	10,020	+ 6.9	+ 6.9
Personal income by place of residence	74,806	76,618	78,827	81,521	83,117	82,543	83,322	+ 1.1	+ 2.8

SOURCE: Bureau of Economic Analysis, special release.

Energy Update

(Continued from page 3)

cast implies less petroleum per capita and per highway vehicle, since people, cars, and trucks will become more numerous. The obvious means of increasing the availability of petroleum for highway use is to curtail its other applications.

Most Americans know petroleum distillate as the oil burned in residential furnaces. In its chemical properties, it is similar to the fuel burned in diesel and jet engines. During 1977, approximately 900 million barrels of distillate were consumed in this country, most of it for space heating in homes and businesses. Substituting natural gas and bottle gas (liquefied petroleum gas, or LPG) would nearly have doubled the amount of energy available for diesel and jet engines. The supply of LPG is almost certain to grow. The supply of natural gas depends on discoveries in this country as well as on negotiations to buy it elsewhere. Both seem promising.

Residual fuel oil is a tar-like residue from the distillation of petroleum in refineries. During 1977, approximately 1.1 billion barrels were consumed in this country, most of it in factories and commercial establishments. This is another potential source of gasoline, diesel oil, and jet engine fuel.

Another means of redirecting the use of petroleum lies in redesigning refineries so as to produce more highway fuels and less of everything else from each barrel of petroleum. This will occur as a matter of course, as worn-out refineries are replaced.

All things considered, it appears that we will produce enough fuel to keep America on wheels, albeit in less safe and more cramped quarters.

The projections in Table 5 were completed in 1978, well before the Three Mile Island incident. It now seems unlikely that nuclear energy will supply 10,320 megawatts by 2000, or even 4,782 megawatts by 1985, as indicated in the 1978 report. We face the prospect of a tight squeeze with respect to the supply-demand balance for electricity in this state.

TABLE 4
Per Capita Energy Consumption in Michigan and the United States, by Fuel Type and Consumer Type: 1960, 1965, and 1977

(millions of BTUs)

	Consumption per capita					
	Michigan			*United States*		
Gross energy consumption	*1960*	*1965*	*1977*	*1960*	*1965*	*1977*
By fuel type						
Gasoline	43	50	67	42	46	65
Residual fuel oil	9	6	15	19	19	33
Distillate	22	19	23	20	20	24
Diesel	1	2	6	2	4	9
Jet fuel	2	3	4	4	6	9
LPG	1	2	4	3	4	5
Kerosene	3	4	1	3	3	2
Coal	86	106	79	55	61	66
Natural gas	48	68	84	58	75	93
Nuclear	0	–	12	0	–	12
Hydro	2	2	1	8	10	11
Other	10	9	12	19	21	28
By consumer type						
Residential	52	59	56	40	43	48
Commercial	23	26	34	24	28	37
Industrial						
Coal	29	31	12	14	14	8
Coke	16	17	12	12	13	10
Natural gas	15	23	30	25	32	40
Electric	5	8	12	7	8	12
Other	22					
Total	82	95	83	85	95	107
Transportation	46	54	77	54	63	90
Other	24	38	56	32	40	73
TOTAL	227	272	306	235	269	355

SOURCE: Developed from U. S. Department of Energy, Energy Information Administration, *Federal Energy Data System (FEDS) Statistical Summary Update* (Washington, D.C.: U. S. Government Printing Office, 1979), Tables 1, 3, 4, 5, and 6; and Bureau of Business and Economic Research, Graduate School of Business Administration, Michigan State University, *Michigan Statistical Abstract*, 15th ed., forthcoming (East Lansing: 1980), Table 2.

TABLE 5
Energy Forecast, Michigan and the United States: 1985 and 2000

	Michigan		*United States*	
Item	*1985*	*2000*	*1985*	*2000*
Energy consumption per capita (in millions of BTUs)	354	421	380	445
Energy consumption (in trillions of BTUs)				
Oil	1,274	815	38,100	26,100
Natural gas	814	744	18,800	18,400
Coal	976	1,827	18,700	39,000
Nuclear, hydro, geothermal, solar, and other	397	947	12,600	33,200
Total	3,461	4,333	88,200	116,700
Energy production				
Crude oil[a]	110	65	10,071	7,240
Natural gas[b]	90	60	17,460	13,000
Coal[c]	0	524	890,000	1,860,000
Electric power[d]	1,105	2,091	32,596	60,998
Electric power source[e]				
Oil	2,570	0	78,000	1,800
Natural gas	659	617	53,500	13,300
Coal	10,991	21,253	266,000	566,000
Nuclear	4,782	10,320	141,000	290,000
Hydro/geothermal	2,393	3,467	79,200	157,000
Other	1,401	2,499	51,900	84,800
TOTAL	22,706	38,156	669,600	1,112,900

SOURCE: U. S. Department of Commerce, Office of Ocean, Resource, and Scientific Policy Coordination, *Preliminary Forecast of Likely U. S. Energy Consumption/Production Balance for 1985 and 2000 by States* (Washington, D.C.: 1978), pp. 48 and 92.
a. Thousand barrels per day.
b. Billion cubic feet per year.
c. Thousand short tons.
d. Trillions of BTUs.
e. Megawatts.

CITATIONS

1. Bureau of the Census, *U.S. Census of Manufactures: 1963, Fuels and Electric Energy Consumed in Manufacturing Industries: 1962* (Washington, D.C.: U.S. Government Printing Office, 1964), Table 6; and Bureau of the Census, *An-*

nual Survey of Manufactures: 1976, Fuels and Electric Energy Consumed (Washington, D.C.: U.S. Government Printing Office, 1978), Table 3.

2. Michigan Department of Commerce, Energy Administration, and the Michigan Energy and Resource Research Association, *Michigan Energy Prospects to the Year 2000* (Lansing: 1979), Table III-A.

BRIEFS

Michigan was third from the bottom in **personal income gain** between the second and third quarters of 1979, according to data just released by the Bureau of Economic Analysis. Iowa and South Dakota, both heavily affected by volatile farm incomes, had smaller percentage income gains than Michigan. Alabama and Mississippi placed just above Michigan in the rankings. Among our own neighbors, Illinois and Wisconsin posted gains slightly above the national average, and Ohio and Indiana slightly below.

This state's economy is sluggish, obviously, because of the slack demand for large cars and small trucks, so popular during 1978. Between the relatively favorable first quarter of 1979 and the third, income earned in durable goods factories located in the Wolverine State declined by 12 percent. The downturn has generated a torpor in almost all other parts of the state's economy. A notable exception is construction. Building activity in Michigan continued to outpace the nation due primarily to the installation of new factories, stores, and office buildings. This state's farmers also had a particularly favorable year, as measured by farm income, whereas farmers fared poorly in the nation as a whole.

The Bureau of Economic Analysis is part of the U. S. Department of Commerce. Among other things, it maintains statistics on the nation's gross national product and on personal income for states. State product accounts generally are not available, hence personal income is employed as a proxy measure of states' overall economic growth. For Michigan, quarterly personal income figures for 1978 and 1979 appear on page 5 of this issue of the *Record*.

The Michigan Agricultural Reporting Service recently released data on **farm production** in the state and the nation in 1979.

Corn and soybean crops in Michigan and the United States hit record levels in 1979. The state's **corn** output of nearly 238 million bushels is 22 percent above last year's crop and 20 percent above the 1977 record. The average yield of 95 bushels per acre surpassed the old record by 10 bushels. Michigan has become the eighth largest producer of corn for grain in the country. U.S. corn production was up 10 percent from last year's record, as the average U.S. yield increased by nearly 9 bushels per acre. A large jump in acreage brought Michigan's **soybean** crop to record levels. Total production in 1979 was 49 percent higher than the 1978 crop and 32 percent better than the 1977 record. U. S. soybean production was 21 percent higher than the record set last year.

Sugarbeet production fell by 11 percent this year, as both harvested acreage and yields were down. Production declines in 14 of the 17 primary sugarbeet states caused U. S. production to drop by 14 percent.

State **popcorn** production jumped 153 percent in 1979 on the strength of an acreage increase of 157 percent. **Alfalfa** production rose 3 percent, and other **hay** production was up 11 percent. **Red clover seed** production dropped 3 percent. Nationally, popcorn, alfalfa, and other hay increased, while red clover seed decreased.

Michigan **turkey** growers raised 1,200,000 turkeys in 1979, one percent less than in the previous two years. Almost all turkeys produced here are heavy breeds, averaging 22–24 pounds liveweight at slaughter time. A December 1 survey of turkey breeder farms records 44,000 hens, up 10 percent from 1978. This increase is contrary to the trend in recent years of declining numbers of breeder hens in the state. Average value per hen on inventory dropped $3.00 in 1979, to $13.00. The increase in numbers was not able to offset the drop in average value, as total value for turkey breeder hens declined 11 percent, to $572,000.

After an incredible production year in 1978, when seven of the eight major **fruit crops** in Michigan posted gains, fruit output in 1979 returned to more normal levels. Production of Michigan's eight major fruit crops in 1979 totaled 536,300 tons, an overall drop of 24 percent. Leading the declines were peaches and prune-plums, both down 42 percent from 1978. The record-breaking low winter temperatures and spring freezes caused a significant amount of dead wood and frozen buds. Sweet cherry production slid 30 percent below last year's all-time record and was also affected by the spring freezes. Apple production fell 26 percent below 1978 output, which had been the largest Michigan harvest in this century. A dry September hurt apple sizing, with all varieties posting declines. The harvest of tart cherries dipped 22 percent, marking the fourth consecutive year of poor production for this volatile crop. Severe spring freezes were mainly responsible. Michigan, however, still ranks as the foremost tart cherry producer in the nation. Grape production slipped 13 percent from last season's fine output. Partially offsetting these declines were an 8 percent increase in pear production and a tremendous 60 percent rise in blueberry production, still recovering from the poor 1977 crop. Michigan remains the largest blueberry producer in the country.

For the United States, apples, sweet cherries, grapes, and pears all posted record production. Also showing increases were blueberries, peaches, and prune-plums. The only fruit crop that declined nationally was tart cherries, to which Michigan's faltering production gave impetus.

As of January 1, 1980, **potato stocks** were down 16 percent from a year ago. Reports from growers, shippers, and processors place stocks at 4.2 million hundred-weight (cwt.), compared with 5.0 million cwt. in January 1979. Disappearance of potatoes from the start of harvest to January 1, 1980, totaled 3.8 million cwt., an increase of 9 percent from the same period last year. Much of the additional disappearance is due to more shrinkage and loss than occurred in 1979. So far this season, 48 percent of the crop has been removed from storage, compared to 41 percent a year ago.

On the U.S. level, an estimated 183 million cwt. of potatoes were in storage in the major producing areas as

of January 1. This is a 7 percent decline from last year's record, but 3 percent more than 1978. The seven eastern states had 30.6 million cwt. in storage, 16 percent more than on January 1, 1979, and 7 percent above 1978. The eight central states had stocks of 34.4 million cwt. on hand, 16 percent below last year, and 8 percent below the 1978 level. Potato stocks in the eight western states, at 118 million cwt., were 9 percent lower than last year's record January 1 holdings, but 5 percent greater than in 1978. Disappearance of the fall crop between January 1, 1979 and 1980 was 114 million cwt., excluding Nevada, down 7 percent from the 122 million cwt. disappearance for the comparable period a year ago. This total disappearance to date includes 18.1 million cwt. of potatoes that were dumped during grading, fed to livestock on potato farms, discarded without grading, and lost due to shrinkage (moisture loss). The quantity of potatoes processed as of January 1, 1980, in the seven major states amounted to 41.4 million cwt., 10 percent below a year earlier.

The **Index of Prices Received** by Michigan farmers increased 3 points (1 percent), to 236, during the month ending December 15, 1979. Both the All Crops Index and the Livestock and Products Index contributed equally to the price gain, as each rose one percent. Leading the commodity group price advances were poultry and eggs, up 7 percent. Also posting rises were feed grains and hay, cash field crops, meat animals, and commercial vegetables. The prices of all dairy products held steady. The only commodity group exhibiting a decline was fruit, down 2 percent. The December Prices Received Index for all farm products was up 10 percent from a year ago.

Eggs, oats, hogs, dry beans, potatoes, hay, milk, corn, and wheat all increased over the month. The price for beef cattle, calves, and lambs remained stable. The only commodity that lost ground on the price front was soybeans, which dipped 2 percent.

For the United States, the December Index of Prices Received increased one point (.05 percent), to 239 percent of its January–December 1967 average. Contributing most to the increase since November were higher prices for hogs, corn, eggs, and cattle. Lower prices for oranges, tomatoes, wheat, soybeans, and cotton were partially offsetting. The index was 17 points (8 percent) above a year ago.

The *Annual Report, Financial Institutions Bureau, Calendar Year 1978* contains data on Michigan **banks.**

State-chartered banks had assets of $20.8 billion as of December 31, 1978, an increase of 9.5 percent from 1977. The 1978 growth rate was lower than the 14.4 percent rate experienced the previous year. Loans (not including federal funds sold and securities purchased under agreement to resell) increased during 1978 by $1.4 billion, or 14.0 percent. This compares to an increase in such loans of 14.6 percent for 1977. Loans as a percentage of assets increased from a year-end 1977 figure of 54.5 percent to 56.7 percent as of December 31, 1978. Obligations of state and political subdivisions increased $144.0 million, or 5.5 percent, during 1978, compared to an 8.1 percent increase in 1977. U. S. Treasury securities increased $22.0 million (1.1 percent) as compared to the 1977 increase of 18.4 percent. Cash and due from depository institutions decreased by one percent during 1978; in 1977 there was an increase of 30.3 percent.

Total deposits of state-chartered banks increased 6.8 percent, to $17.9 billion, during 1978, compared to an increase of 14.2 percent for 1977. Demand deposits increased by $261.1 million (6.2 percent). Time and savings deposits increased by $873.6 million (6.9 percent).

Federal funds purchased and securities sold under agreement to repurchase increased by 54.2 percent, compared to the 1977 increase of 39.8 percent.

Total equity capital accounts increased by 10.7 percent; in 1977 the increase was 9.5 percent. Capital growth was 1.2 percent more than asset growth for 1978.

Income before income taxes and securities gains or losses increased 26.8 percent, to $231.7 million, during 1978; in 1977 a 24.4 percent increase was posted. Total operating income rose by 20.9 percent, while total operating expense rose by 20.0 percent. Net income after taxes, securities gains or losses, and extraordinary charges or credits increased 16.0 percent during 1978, compared to a 17.3 percent increase for 1977. A net securities loss of $5.1 million was experienced during 1978, whereas there was a gain of $.4 million in 1977. Interest and fees on loans increased 23.0 percent during 1978, compared to a 1977 increase of 14.5 percent.

Interest on time and savings deposits increased 18.1 percent for 1978, 11.2 percent in 1977.

Provision for possible loan losses increased $8.5 million (or 32.4 percent), compared to a decrease of $2.4 million (or 8.3 percent) during 1977.

During 1978, the number of state bank offices increased from 1,114 to 1,170. The establishment of one de novo bank, a conversion from federal to state charter, and one consolidation resulted in a net increase of state-chartered banks, from 239 on December 31, 1977, to 240 as of December 31, 1978. The number of branch offices increased from 875 to 930 during the same period.

As of year-end 1978, 42 bank holding companies controlled 82 state-chartered banks and 71 national banks. One-bank holding companies controlled 15 state-chartered banks and 5 national banks; multibank holding companies controlled 67 state-chartered banks and 66 national banks. Total deposits of banks controlled by bank holding companies at year-end 1978 were $30.3 billion, which represents 74.6 percent of the $40.6 billion total deposits held by all banks in Michigan.

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